WHAT IS CLAIMED IS:

1. An image area extract unit for extracting a characteristic portion from an original image, comprising:

original image acquisition means for acquiring said original image;

training image acquisition means for acquiring a training image taken under a same condition under which said original image is taken;

supervisory image acquisition means for acquiring a supervisory image that designates a characteristic portion of said training image, said supervisory image including pixels each of which provides a supervisory output, the characteristic portion of said training image corresponding to the characteristic portion of said original image;

model generation means for generating a pixel evaluation model based on a relationship between a value of a first pixel of said training image and the supervisory output provided by a second pixel of said supervisory image, said second pixel corresponding to said first pixel, said pixel evaluation model receiving a value of one of pixels of said original image as an input and outputting a feature value of the pixel; and

area definition means for calculating the feature value of each pixel of said original image by using said pixel evaluation model and defining an extractive area of said original image based on the feature value of each pixel of said original image, said extractive area including the characteristic portion of said original image.

2. An image area extract unit as in claim 1, wherein said area definition means determines whether each pixel of said original image belongs to the characteristic portion of said original image based on the feature value of the pixel, and defines said extractive area of said original image based on a result of the determination.

3. An image area extract unit as in claim 1, wherein said model generation means sequentially generates a plurality of partial polynomials according to a Group Method of Data Handling so that an estimation model that includes at least one of said plurality of partial polynomial is generated as said pixel evaluation model.

4. An image area extract unit as in claim 3, wherein, if an evaluation value of a first partial polynomial generated as one of said plurality of partial polynomials is improved as compared with an evaluation value of a second partial polynomial generated as one of said plurality of partial polynomials previous to said first partial polynomial, said model generation means employs said first partial polynomial as the polynomial included in said pixel evaluation model and an output of said first partial polynomial is provided as an output of said pixel evaluation model.

5. An image area extract unit as in claim 3, wherein, if an

evaluation value of a partial polynomial generated as one of said plurality of partial polynomials satisfies a predetermined criterion, said model generation means employs said partial polynomial as the polynomial included in said pixel evaluation model and an output of said partial polynomial is provided as an output of said pixel evaluation model.

6. An image area extract unit as in claim 3, wherein each of said plurality of partial polynomials generated by said model generation means includes three variables selected from an input variable group that includes a variable corresponding to a value of a pixel of said training image

7. An image area extract unit as in claim 6, wherein each of said plurality of partial polynomials generated by said model generation means is expressed as:

$$c_0 + c_1x_p + c_2x_q + c_3x_r + c_4x_p^2 + c_5x_q^2 + c_6x_r^2 + c_7x_px_q + c_8x_px_r + c_9x_qx_r$$

where x_p, x_q, x_r are said selected three variables and c_0, c_1, c_2, c_3, c_4, c_5, c_6, c_7, c_8, c_9 are coefficients.

8. An image area extract unit as in claim 6, wherein each of said plurality of partial polynomials generated by said model generation means is expressed as:

$$c_0 + c_1x_p + c_2x_q + c_3x_r + c_4x_px_q + c_5x_px_r + c_6x_qx_r$$

where x_p, x_q, x_r are said selected three variables and c_0, c_1, c_2, c_3, c_4, c_5, c_6 are coefficients.

9. An image area extract unit as in claim 1,

wherein said original image acquisition means converts a first image taken under a condition into a second image in which a characteristic portion of said first image is identified, and provides said second image as said original image, and

wherein said training image acquisition means converts a third image, which is taken under the same condition under which said first image is taken, into a fourth image in which a characteristic portion of said third image is identified, and provides said fourth image as said training image.

10. An image area extract unit as in claim 1, wherein said first pixel is one of representative pixels that are selected from all pixels of said training image.

11. An image area extract unit as in claim 1, wherein said area definition means generates, as a result of definition, extract instruction data that designates pixels belonging to said extractive area of said original image.

12. A method for extracting a characteristic portion from an original image, said method comprising the steps of:

acquiring said original image;

acquiring a training image taken under a same condition under which said original image is taken;

acquiring a supervisory image that includes pixels corresponding to pixels of said training image, said supervisory image designating a characteristic portion of said training image, the characteristic portion of said training image corresponding to the characteristic portion of said original image;

generating a pixel evaluation model using said training image and said supervisory image, said pixel evaluation model receiving a value of one of pixels of said original image and outputting a feature value of the pixel;

calculating the feature value of each pixel of said original image by using said pixel evaluation model; and

defining an extractive area of said original image based on the feature value of each pixel of said original image, said extractive area including the characteristic portion of said original image.

13. A method as in claim 12, wherein said pixel evaluation model includes at least one partial polynomial.

14. A method as in claim 13, wherein said generating step comprises the steps of:

(a) selecting a predetermined number of variables from an input variable group that includes a variable corresponding

to a value of a pixel of said training image;

(b) generating a first partial polynomial that includes said selected variables as input variables based on a relationship between a value of a first pixel of said training image and a value of a second pixel of said supervisory image, said second pixel corresponding to said first pixel;

(c) calculating an evaluation value of said first partial polynomial based on a relationship between a value of a third pixel of said training image and a value of a fourth pixel of said supervisory image, said fourth pixel corresponding to said third pixel;

(d) storing said first partial polynomial as the partial polynomial included in said pixel evaluation model and adding an output variable of said first partial polynomial to said input variable group, if said evaluation value of said first partial polynomial satisfies a predetermined criterion for employment of a partial polynomial; and

(e) repeating the steps (a) to (d) if a predetermined criterion for termination of model generation is not satisfied.

15. A method as in claim 14, wherein the predetermined number of variables that is selected at said selecting step is 3.

16. A method as in claim 15, wherein said first partial polynomial generated at said generating step is expressed as:

$$c_0 + c_1x_p + c_2x_q + c_3x_r + c_4x_p^2 + c_5x_q^2 + c_6x_r^2$$

$$+ c_7x_px_q + c_8x_px_r + c_9x_qx_r$$

where x_p, x_q, x_r are said selected three variables and c_0, c_1, c_2, c_3, c_4, c_5, c_6, c_7, c_8, c_9 are coefficients.

17. A method as in claim 15, wherein said first partial polynomial generated at said generating step is expressed as:

$$c_0 + c_1x_p + c_2x_q + c_3x_r + c_4x_px_q + c_5x_px_r + c_6x_qx_r$$

where x_p, x_q, x_r are said selected three variables and c_0, c_1, c_2, c_3, c_4, c_5, c_6 are coefficients.

18. A method as in claim 14, wherein said predetermined criterion for employment of a partial polynomial is that said evaluation value of said first partial polynomial is improved as compared with an evaluation value of a second partial polynomial that is generated at said generating step previous to said first partial polynomial.

19. A computer program for extracting a characteristic portion from an original image, said computer program comprising:

program code for acquiring said original image;

program code for acquiring a training image taken under a same condition under which said original image is taken;

program code for acquiring a supervisory image that includes pixels corresponding to pixels of said training image,

said supervisory image designating a characteristic portion of said training image, the characteristic portion of said training image corresponding to the characteristic portion of said original image;

program code for generating a pixel evaluation model based on a relationship between a value of a first pixel of said training image and a value of a second pixel of said supervisory image, said second pixel corresponding to said first pixel, said pixel evaluation model receiving a value of one of pixels of said original image and outputting a feature value of the pixel;

program code for calculating the feature value of each pixel of said original image by using said pixel evaluation model; and

program code for defining an extractive area of said original image based on the feature value of each pixel of said original image, said extractive area including the characteristic portion of said original image.

20. A record medium which stores a computer program for extracting a characteristic portion from an original image, said program comprising:

program code for acquiring said original image;

program code for acquiring a training image taken under a same condition under which said original image is taken;

program code for acquiring a supervisory image that designates a characteristic portion of said training image, said supervisory image including pixels each of which provides a

supervisory output, the characteristic portion of said training image corresponding to the characteristic portion of said original image;

program code for generating a pixel evaluation model based on a relationship between a value of a first pixel of said training image and the supervisory output provided by a second pixel of said supervisory image, said second pixel corresponding to said first pixel, said pixel evaluation model receiving a value of one of pixels of said original image and outputting a feature value of the pixel;

program code for calculating the feature value of each pixel of said original image by using said pixel evaluation model; and

program code for defining an extractive area of said original image based on the feature value of each pixel of said original image, said extractive area including the characteristic portion of said original image.